PRELIMINARY OWNER/OPERATOR'S MANUAL

GAPLUS

PRELIMINARY

Bally

MIDWAY MFG. CO.

10601 W Belmont Avenue
Franklin Park, Illinois 60131
U.S.A.

Phone: (312) 451-9200 Cable Address: MIDCO Telex No.: 72-1596

M051-00A87-A014

PRELIMINARY INSTRUCTIONS FOR GAPLUS

INSTALLATION

1. Unlock and open the coin box door.

2. Remove four (4) "CABINET LEVELING LEGS" from inside the coin box.

3. Tip the cabinet to the side and remove the shipping cleats from its bottom.

   ° Locate the threaded holes - one in each corner - and install the "CABINET LEVELING LEGS" in them.

   ° Level the cabinet.

   ° When finished, the cabinet should be stable in the upright position.

4. Close and lock the rear access door and plug the game into a **standard** A.C. wall outlet **ONLY.**

> ------**WARNING**------
> Game **MUST** be
> properly grounded.

LINE VOLTAGE SAFETY INTERLOCK SWITCHES

Line voltage SAFETY INTERLOCK SWITCHES have been provided for your protection. The locations of these SAFETY INTERLOCK SWITCHES are:

1. UPRIGHT MODEL: Inside the rear of the cabinet at the side of the rear access door.

When the cabinet access door(s) are secured in place, the SAFETY INTERLOCK SWITCH plunger(s) are in a fully depressed condition. The game circuit can function normally.

When any cabinet access door(s) are opened, the SAFETY INTERLOCK SWITCH plunger(s) are in a partially extended condition. This isolates the game circuit from the line voltage.

To restore power to the game circuit with the access door(s) open, gently pull the SAFETY INTERLOCK SWITCH plunger(s) out to the fully extended condition. **THIS IS TO BE USED FOR SERVICING THE GAME ONLY!**

SELF-TEST

A slide switch is provided to make the game run a "Self-Test" on itself. The SELF-TEST SWITCH is located on a mounting bracket just inside the coin door opening.

When in the Self-Test mode, the monitor screen will display the results of certain test functions it has run on itself.

TO SERVICE THE CONTROL PANEL

1. UPRIGHT MODEL:

° The control panel is held in place by three latches, one on the left side, one on the right side, and one in the center of the front of the cabinet.

They are spring loaded to provide constant positive pressure on their latch plates.

They can be reached through the coin door **AFTER turning power to the game off.**

To release the latches, lift up and toward the center of the control panel.

Once they are released, unhook them from their latch plates.

° To remove the control panel:

Cradling the control panel between yourself and the cabinet, disconnect it from its cabling and any miscellaneous hardware.

The control panel is now free and can be removed.

° To reinstall the control panel, reverse this procedure.

REMOVAL OF THE MAIN-DISPLAY-GLASS AND/OR THE T.V. BEZEL ASSEMBLY

1. UPRIGHT MODEL:

NOTE: In order to do this, the control panel **MUST** be removed first. See the "UPRIGHT MODEL" procedure.

° **Turn the power to the game off** and remove the control panel. This frees the main-display-glass so it can be lifted up.

° By putting your finger in the hole in the middle of the main-display-glass support, you can lift it up and out.

° Loosen the screws which secure the T.V. bezel-glass-clamps in place.

Move the clamps to the side and the bezel glass may be removed.

Remove the bezel securing screws and the bezel with four bezel-glass-clamps may be removed.

° To reinstall the T.V. bezel assembly and the main-display-glass, reverse this procedure.

VOLUME CONTROL POT

The volume control pot is located on the games Logic P.C. Board in the back of the game cabinet. For adjustment, it may be reached through the games rear access door.

To make the sounds louder, turn the pot clockwise as you face it.

To make the sounds **less** loud, turn the pot counterclockwise as you face it.

CAUTION

° Be sure to check the PC Board for any foreign particles i.e. dust, etc.. Foreign particles on the PC Board are one of the main causes of the PC Board malfunctions.

° When in doubt as to the cause of any particular problem, **ALWAYS** take the PC Board to your distributor for repair. DO NOT attempt to repair the PC Board yourself by using a volt-ohm meter or other testing equipment.

° When transporting the PC Board, be sure to pack the board carefully with air caps, sponge or other packing materials.

PC BOARD

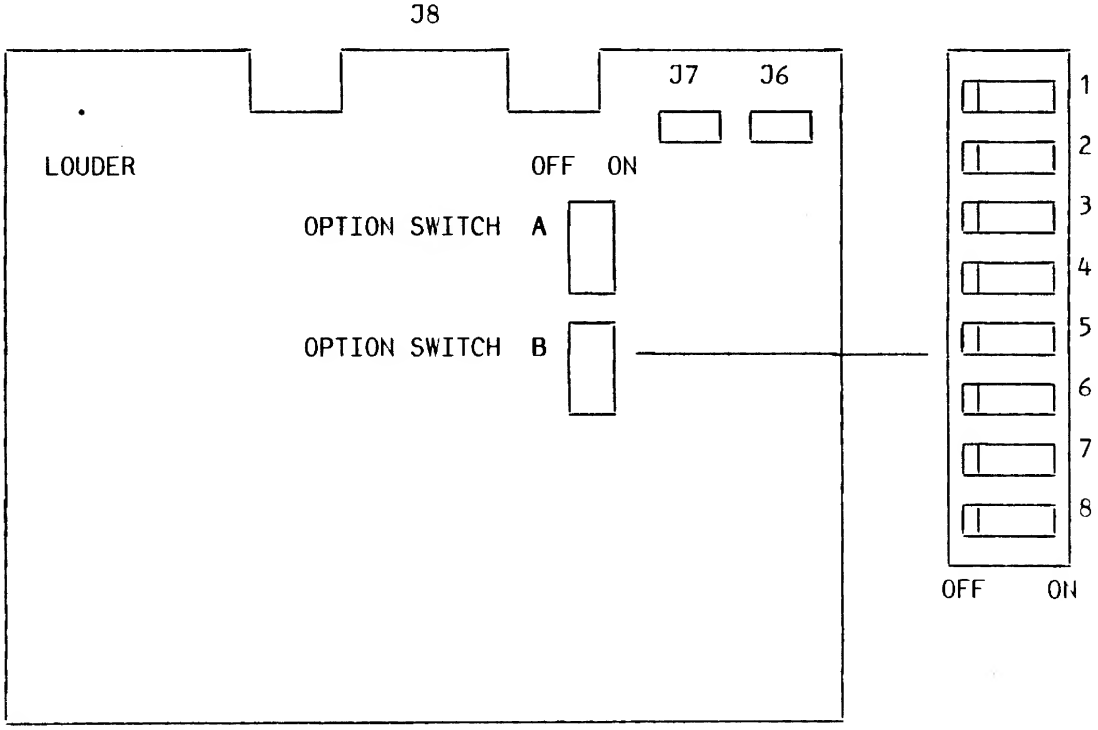
° Option Switches:

The game fee, bonus points, etc. are operator-adjustable. See the Option Switch Settings Table.

To perform the Self-Test, use the test switch located on the bracket just inside your games coin door.

° Volume:

Adjust the game volume as desired. **DO NOT** place any unnecessary pressure on the volume control knob.

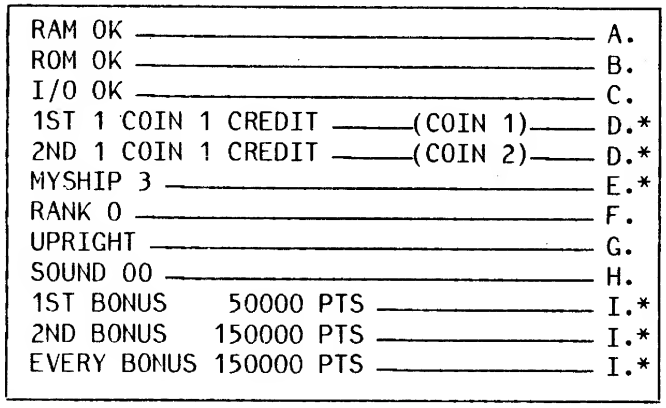


SELF-TEST

The Self-Test mode is a special mode for checking game switches and computer functions. It is the easiest and best way to check for proper operation of the entire game.

You may begin a Self-Test at any time after the power to the game is on by sliding the Self-Test switch to the "ON" position. Now that the game is in the Self-Test mode, it will act as follows:

° The Self Test will take about five (5) seconds to perform. The following check list will appear on the screen.



A. RAM Test: If "OK" appears, RAM is normal.

B. ROM Test: If "OK" appears, ROM is normal.

C. I/O Test: If "OK" appears, I/O is normal.

D. Game Fee Indicator: If 1 coin/1 game appears, the game fee is normal.

E. Number of Fighters: If "3" appèars, the number of Fighters is normal.

F. Rank: If "0" appears, rank is normal.

G. Table Specification: If "TABLE" appears for the Cocktail Table model and for the Upright Model, "UPRIGHT" appears, model specification is normal.

H. Sound Test: A sound should appear when the control lever, firing button and the start button is pushed.

I. Bonus Points: This game has been set for the first 50,000 points, then 150,000 points and for every 150,000 points thereafter.

* By using the OPTION SWITCH; "D", "E", and "I" are operator-adjustable.

When finished with the Self-Test mode, slide the Self-Test switch back to the "OFF" position and normal game functions will now return to the monitor screen.

CROSS HATCH PATTERN

Turn "ON" the Self-Test switch, push the Service button, and a cross hatch pattern will appear. Push the button one more time and the Self-Test mode will appear. Use this pattern when making adjustments to the monitor.

ADJUSTING GAME FEE, BONUS POINTS, ETC.

This is accomplished by using the various switches located on the games Logic P.C. Board. See the OPTION SWITCH SETTINGS tables and switch location information in this instruction sheet.

Turn the power switch "OFF" and then proceed to set the Option Switches.

After setting the option switches, again perform the Self-Test.

The settings of these switches are only read by the game on "POWER-UP".

GAPLUS

OPTION SWITCH SETTINGS - DIP SWITCH "A"

////////////////////////////////VARIOUS GAME PLAY OPTIONS////////////////////////////////

NUMBER OF FIGHTERS GAME BEGINS WITH	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
* 3 FIGHTERS	OFF	OFF				NOT		
2 FIGHTERS	OFF	ON				USED		
4 FIGHTERS	ON	OFF				OFF		
5 FIGHTERS	ON	ON				OFF		

COIN #1 - NUMBER OF COINS PER CREDIT	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
* 1 COIN 1 CREDIT			OFF	OFF		OFF		
1 COIN 2 CREDITS			OFF	ON		OFF		
2 COINS 1 CREDIT			ON	OFF		OFF		
3 COINS 1 CREDIT			ON	ON		OFF		

SOUND	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
SOUND IN ATTRACT MODE					OFF	OFF		
* NO SOUND IN ATTRACT MODE					ON	OFF		

COIN #2 - NUMBER OF COINS PER CREDIT	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
* 1 COIN 1 CREDIT						OFF	OFF	OFF
1 COIN 2 CREDITS						OFF	OFF	ON
2 COINS 1 CREDIT						OFF	ON	OFF
3 COINS 1 CREDIT						OFF	ON	ON

* INDICATES FACTORY RECOMMENDED SETTINGS

PART NO. M051-00A87-B007

GAPLUS

OPTION SWITCH SETTINGS - DIP SWITCH "B"

////////////////////////////////VARIOUS GAME PLAY OPTIONS////////////////////////////////

SELF-TEST MODE	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
* NORMAL	OFF							
TEST	ON							

"RANK" = DIFFICULTY LEVEL OF PLAY	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
EASIEST LEVEL OF PLAY 1		OFF	OFF	ON				
* 0 **STANDARD LEVEL OF PLAY**		OFF	OFF	OFF				
PROGRESSIVELY MORE DIFFICULT LEVELS OF PLAY 2		OFF	ON	OFF				
3		OFF	ON	ON				
4		ON	OFF	OFF				
5		ON	OFF	ON				
6		ON	ON	OFF				
7		ON	ON	ON				

** ROUND ADVANCE	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
* NORMAL					OFF			
ADVANCE					ON			

BONUS SHIPS AWARDED AT:	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8
1st @ 100,000; 2nd @ 300,000 & every 600,000						OFF	OFF	OFF
1st @ 150,000; 2nd @ 400,000						OFF	OFF	ON
1st @ 150,000; 2nd @ 400,000 & every 900,000						OFF	ON	OFF
1st @ 100,000; 2nd @ 300,000 & every 300,000						OFF	ON	ON
1st @ 50,000; 2nd @ 200,000 & every 300,000						ON	OFF	OFF
1st @ 50,000; 2nd @ 150,000 & every 600,000						ON	OFF	ON
1st @ 50,000; 2nd @ 150,000 & every 300,000						ON	ON	OFF
* 1st @ 30,000; 2nd @ 150,000 & every 600,000						ON	ON	ON

** BY TURNING **"ON"** THE OPTION SWITCH WHILE **"PARSEC"** IS BEING INDICATED ON THE SCREEN, YOU CAN ADVANCE THROUGH THE **"ROUNDS"**. PUSH THE ONE PLAYER CONTROL LEVER FORWARD (PLAYER NUMBER ONE **UP** SWITCH IS **"ON"**) TO INDICATE THE NUMBER. THE INDICATED ROUND NUMBER WILL APPEAR ON THE MONITOR SCREEN WHEN THE OPTION SWITCH IS TURNED **"OFF"**.

* INDICATES FACTORY RECOMMENDED SETTINGS

PART NO. M051-00A87-B007

THIS TAG TO BE TYPESET AND REPRODUCED IN BLACK INK ON HEAVY WHITE 8" x 11" CARD STOCK

TOLERANCE = ± 1/2"

GAME PLAY

With the eight-way joystick, maneuver your fighter and fire your missiles using the firing button to shoot down "GAPLUS".

"GAPLUS" comes in different varieties. Depending upon the variety and the flight pattern, the number of points received will vary. Also, when "GAPLUS" is in formation, the number of points received will vary. The following indicates the number of points each "GAPLUS" is worth at different times.

	When in Formation	When Attacking
(a) Queen Gaplus	100	400
(b) Ad Gaplus	100	400
(c) Cap Gaplus	100	300
(d) Lute Gaplus	100	200
(e) Zako Gaplus	100	100

Destroy all "GAPLUSES" and the round will clear. The "QUEEN GAPLUS" possesses the BLASTER HEAD. When the QUEEN GAPLUS is shot down, the Blaster Head will connect onto the player's fighter enabling it to power up!!!

° PHALANX ATTACK:

The tractor beam will swallow up the enemy and reform them to the good side as your fighter's ally. Result...multi-missle attacking capability.

° HYPER ATTACK:

Moving at lightening speed, the player's fighter will fire off missiles in the multiples of two.

° CYCLONE ATTACK:

The cyclone beam will draw in the enemy and smash them apart!!! Points received will double each time, 200, 400,... 6,400!

When throwing off his beam, the player's fighter can only move right and left. Also, when the Blaster Head is mounted onto the fighter's plane, he will become invincible.

When the Blaster Head is connected onto the Queen Gaplus and it is hit once, the Queen will change colors. You must hit it one more time to destroy the Queen.

Challenging Stage:

- The Challenging Stages are in Rounds 3, 8, 13, 18, ... During this stage, the enemy will continually fly about the screen. At the top of the screen, Gaplus will form a letter or a bar across the screen. When all the Gapluses leave the screen, the following bonus points are given.

- The number of Gapluses to form a letter x 100
- The number of Gapluses to form a bar x 200

Also, if the letters are completed, the following
- "B O N U S" --- Bonus points of 10,000
- "G A P L U S" --- Bonus points of 0 - 5,000
  (Push the firing button to stop the rotating number located under your total score and then your grand total will appear.)
- "D O U B L E" --- Bonus points will double.
- "T R I P L E" --- Bonus points will triple.

Star Flash:

- A flash will appear on the screen and at the same time a star will appear attacking the player's fighter. When the star approaches the fighter, it will split up into four parts. The fighter must fire his missiles at all four parts.

"Bean Curd" (Tofu) Attack:

- When Gaplus peels off from the formation and is hit, his ghost (looking like a Bean Curd) will fall from the sky. The fighter must shoot it down.

If the player's fighter is touched by: Gaplus, missiles, star flash or the bean curd; it is a miss. The Blaster Head will disintegrate when a miss is made.

During the Phalanx Attack when Gaplus has become the fighter's ally, if Gaplus is touched by a missle or bean curd it is not a miss.

As bonus points are added up, a bonus ship will be awarded. The Queen Gaplus will bring down parts of the fighter's plane (three in all). When all three are put together, one bonus ship is added on.

The Best players to date can enter their initials on the screen by using the joystick to select a letter and then pushing the FIRE button.

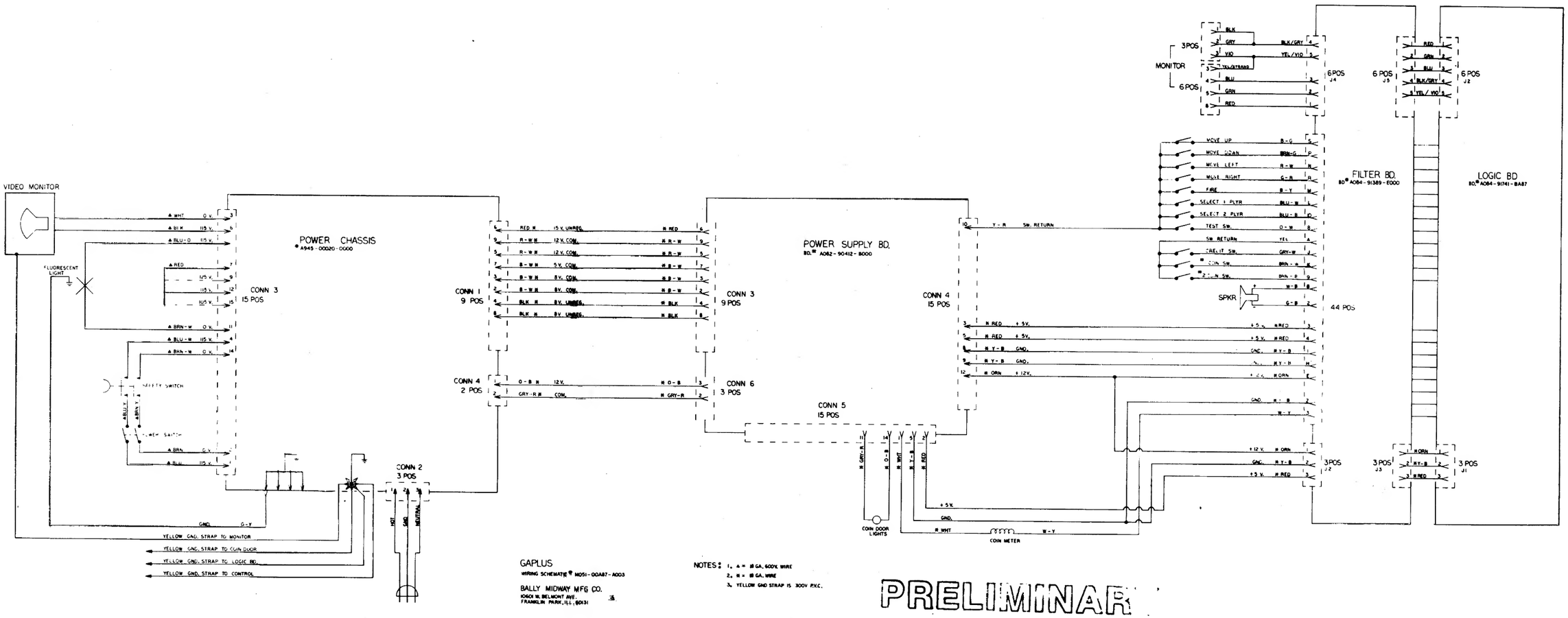
BALLY/MIDWAY'S GAPLUS
U.R. #0A87
PROGRAMED PART NUMBERS

UNPROGRAMED LOGIC BD. A082-91741-BA87
PROGRAMED GAPLUS LOGIC BD. A084-91741-BA87

POS.	MIDWAY PART NUMBER
8N	0A87-00803-0003
3E	0A87-00803-0004
3F	0A87-00803-0005
1D	0A87-00803-0006
2D	0A87-00803-0007
1C	0A87-00803-0008
4F	0A87-00803-0009
8G	0A87-00803-0010
7B0	0A87-00803-0011
9C1	0A87-00803-0012
9D2	0A87-00803-0013
9E3	0A87-00803-0014
9L4	0A87-00803-0015
6N5	0A87-00803-0016
6M6	0A87-00803-0017
6L	0A87-00803-0018
5N	0A87-00803-0019
5L	0A87-00803-0020
5M	0A87-00803-0021
5K	0A87-00803-0022

PRELIMINARY

6/29/84	RELEASE FOR PRODUCTION	



GAPLUS

WIRING SCHEMATIC * M051 - 00A87 - A003

BALLY MIDWAY MFG CO.

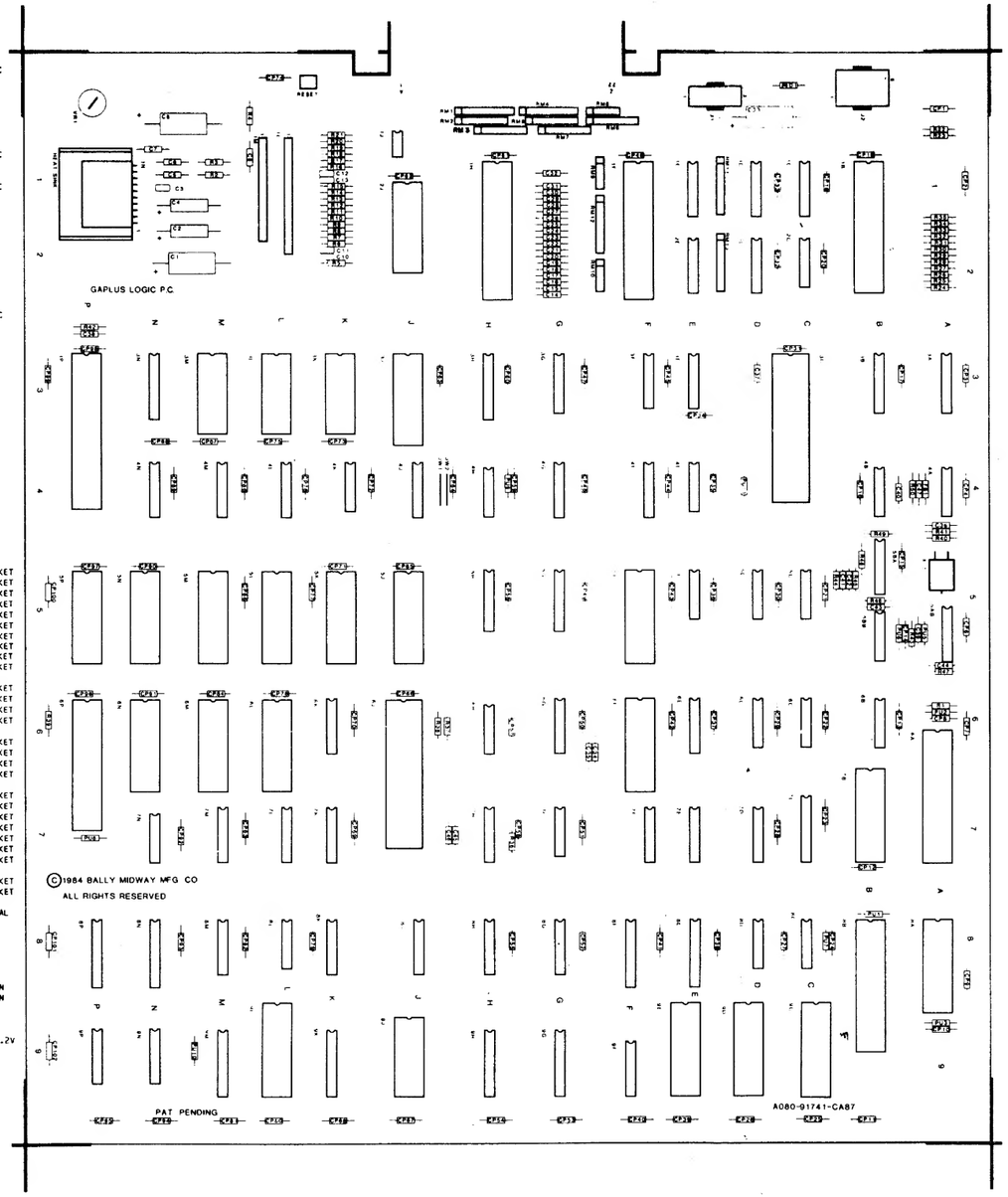
10601 W. BELMONT AVE.
FRANKLIN PARK, ILL., 60131

NOTES: 1. A = 18 GA. 600V. WIRE
2. H = 18 GA. WIRE
3. YELLOW GND STRAP IS 300V P.V.C.

PRELIMINAR

DESIGNATION LIST

DESIGNATION NO.	DESCRIPTION	DESIGNATION NO.	DESCRIPTION
C1	10 UF AX CER	IC 5J	11XX CUSTOM IC
C2	2.2 UF AX CER	IC 5K,5L,5M,5N	ROM
C3	.01 UF AX CER	IC 5P	NOT USED
C4	47 UF AX ELEC	IC 6A	68A09E CPU
C5,C6	.033 UF POLY	IC 6B	74LS20
C7	.1 UF AX CER	IC 6C	74LS08
C8	470 UF AX ELEC	IC 6D	74LS04
C9	.1 UF AX CER	IC 6E	74LS365
C10-C13	.01 UF POLY	IC 6F	33XX CUSTOM IC
C14-C32	.01UF AX CER	IC 6G	74LS365
C33	470 UF AX ELEC	IC 6H	74LS32
C34,C35	680 PF AX CER	IC 6J	20XX CUSTOM IC
C36	100 PF AX CER	IC 6K	74LS157
C37	47 PF AX CER	IC 6L,6M,6N	ROM
C38-C46	100 PF AX CER	IC 6P	68A09E CPU
C47	68 PF AX CER	IC 7B	ROM
		IC 7C	74LS245
CP1-CP4	.1 UF AX CER	IC 7D,7E	74LS257
CP6-CP102		IC 7F	74LS158
		IC 7G	74LS04
R1	330 OHM 1/4W 5%	IC 7H	74LS368
R2,R3	4.7 OHM 1/4W 5%	IC 7K,7L,7M	74LS157
R4	22K OHM 1/4W 5%	IC 7N	74LS74
R5	10K OHM 1/4W 5%	IC 8A	34XX CUSTOM IC
R6	150K OHM 1/4W 5%	IC 8B	68A09E CPU
R7	4.7K OHM 1/4W 5%	IC 8C	74S74
R8	10K OHM 1/4W 5%	IC 8D	74LS00
R9	22K OHM 1/4W 5%	IC 8E,8F	74LS245
R10	47K OHM 1/4W 5%	IC 8G	ROM
R11	4.7K OHM 1/4W 5%	IC 8H	74LS375
R12	10K OHM 1/4W 5%	IC 8J	NOT USED
R13	22K OHM 1/4W 5%	IC 8K	NOT USED
R14	47K OHM 1/4W 5%	IC 8L	74LS86
R15	150K OHM 1/4W 5%	IC 8M	74LS139
R16	470K OHM 1/4W 5%	IC 8N	ROM
R17,R18	10K OHM 1/4W 5%	IC 8P	74LS245
R19	470K OHM 1/4W 5%	IC 9C,9D,9E	ROM
R20,R21	2.2K OHM 1/4W 5%	IC 9F	NOT USED
R22	1K OHM 1/4W 5%	IC 9G	74LS273
R23	100 OHM 1/4W 5%	IC 9H	74LS245
R24	220 OHM 1/4W 5%	IC 9J	M58725P RAM
R25	470 OHM 1/4W 5%	IC 9K	74LS273
R26	1K OHM 1/4W 5%	IC 9L	ROM
R27	2.2K OHM 1/4W 5%	IC 9M	74LS273
R28	1K OHM 1/4W 5%	IC 9N	74LS298
R29	470 OHM 1/4W 5%	IC 9P	74LS153
R30	220 OHM 1/4W 5%		
R31	2.2K OHM 1/4W 5%	ICS 1BS	40 PIN IC SOCKET
R32	1K OHM 1/4W 5%	ICS 1CS,1DS	16 PIN IC SOCKET
R33	470 OHM 1/4W 5%	ICS 1FS,1HS	42 PIN IC SOCKET
R34	220 OHM 1/4W 5%	ICS 2DS	16 PIN IC SOCKET
R35	2.2K OHM 1/4W 5%	ICS 2JS	28 PIN IC SOCKET
R36	330 OHM 1/4W 5%	ICS 3AS,3BS	18 PIN IC SOCKET
R37,R38	470 OHM 1/4W 5%	ICS 3CS	64 PIN IC SOCKET
R39	330 OHM 1/4W 5%	ICS 5ES	16 PIN IC SOCKET
R40,R41	180 OHM 1/4W 5%	ICS 3JS	28 PIN IC SOCKET
R42	240 OHM 1/4W 5%	ICS 3KS,5LS, 5MS,5PS(X2)	24 PIN IC SOCKET
R43-R46	JUMPER WIRE		
R47-R49	1K OHM 1/4W 5%	ICS 4FS	16 PIN IC SOCKET
R50	NOT USED	ICS 5FS	28 PIN IC SOCKET
		ICS 5GS,5HS	18 PIN IC SOCKET
PU1-PU3	1K OHM 1/4W 5%	ICS 5JS,5KS 5LS,5MS,5NS	28 PIN IC SOCKET
PU5-PU11		ICS 6AS	40 PIN IC SOCKET
RM8	1K OHM 5 PIN SIP	ICS 6FS	28 PIN IC SOCKET
RM1,4,11,13	1K OHM 9 PIN SIP	ICS 6JS	64 PIN IC SOCKET
RM2,3,5,6,7	2.2K OHM 8 PIN SIP	ICS 6LS,6MS, 6NS	28 PIN IC SOCKET
RM9,RM10	4.7K OHM 6 PIN SIP	ICS 6PS	40 PIN IC SOCKET
RM12	4.7K OHM 9 PIN SIP	ICS 7BS	28 PIN IC SOCKET
		ICS 8AS	28 PIN IC SOCKET
IC 1B	26XX CUSTOM IC	ICS 8BS	40 PIN IC SOCKET
IC 1C,1D	ROM	ICS 8GS	16 PIN IC SOCKET
IC 1F	58XX CUSTOM IC	ICS 8HS	20 PIN IC SOCKET
IC 1H	36XX CUSTOM IC	ICS 9CS,9DS	28 PIN IC SOCKET
IC 1J	OP AMP TL 082	9ES	
IC 1L	98XX CUSTOM IC	ICS 9JS	24 PIN IC SOCKET
IC 1M	99XX CUSTOM IC	ICS 9LS	28 PIN IC SOCKET
IC 1N	4460 AUDIO AMP		
IC 2C	74LS30		
IC 2D	ROM	X1	24.576 MHZ XTAL
IC 2J	62XX CUSTOM IC		
IC 3A,3B	M88148L-55 RAM	1E	8 POS DIP SW
IC 3C	29XX CUSTOM IC	2E	8 POS DIP SW
IC 3E,3F	ROM		
IC 3G	2114 RAM	JW1,JW2	JUMPER WIRE
IC 3H	74LS245		
IC 3J	16XX CUSTOM IC	J1	3 PIN AMP CONN
IC 3K,3L,3M	M58725 RAM	J2	6 PIN AMP CONN
IC 3N	74LS245		
IC 3P	21XX CUSTOM IC	VR1	2K OHM POT
IC 4A	74S04		
IC 4B	NOT USED	D1	ZENER DIODE 6.2V
IC 4E	74LS20		
IC 4F	ROM	FB1	JUMPER WIRE
IC 4G	74LS157		
IC 4H	74LS74	HEATSINK AUD AMP	HEATSINK
IC 4J	74LS157		
IC 4K	74LS00	MNTG SCRW 4-40X7 PAN HD	
IC 4L	74LS174	#4 FLT WASHER	
IC 4M	74LS175	4-40 HEX NUTS	
IC 4N	74LS378		
IC 5AB	74S163	THERMAL CMPD	
IC 5BA	74S139		
IC 5BB	74LS86		
IC 5C	74LS04		
IC 5D	74LS08		
IC 5E	74S10		
IC 5F	15XX CUSTOM IC		
IC 5G,5H	M88148L-55 RAM		



CROSS REFERENCE LIST

DESCRIPTION	QTY	DESIGNATION NO.	PART NUMBER
47 PF AX CER	1	C37	0986-00800-2800
68 PF AX CER	1	C47	0360-00800-0010
100 PF AX CER	10	C36,C38-C46	0464-00800-0006
680 PF AX CER	2	C34,C35	0358-00800-0002
.01 UF AX CER	19	C14-C32	0353-00800-0001
.01 UF POLY	5	C3,C10-C13	0550-00800-1000
.033 UF POLY	2	C5,C6	0353-00800-0002
.1 UF AX CER	103	C7,C9,CP1-CP4 CP6-CP102	0508-00800-0900
2.2 UF AX ELEC	1	C2	0353-00800-0005
10 UF AX ELEC	1	C1	0508-00800-1100
47 UF AX ELEC	1	C4	0353-00800-0003
470 UF AX ELEC	2	C8,C33	0550-00800-1300
4.7 OHM 1/4W 5%	2	R2,R3	100E-00005-0007
100 OHM 1/4 5%	1	R23	100E-00005-0033
180 OHM 1/4W 5%	2	R40,R41	100E-00005-0039
220 OHM 1/4W 5%	3	R24,R30,R34	100E-00005-0041
240 OHM 1/4W 5%	1	R42	100E-00005-0043
330 OHM 1/4W 5%	3	R1,R36,R39	100E-00005-0047
470 OHM 1/4W 5%	5	R25,R29,R33,R37, R38	100E-00005-0051
1K OHM 1/4W 5%	17	R22,R26,R28,R32, R47-R49,PU1-PU3, PU5-PU11	100E-00005-0061
2.2K OHM 1/4W 5%	5	R20,R21,R27,R31, R35	100F-00005-0069
4.7K OHM 1/4W 5%	2	R7,R11	100E-00005-0079
10K OHM 1/4W 5%	5	R5,R8,R12,R17,	100E-00005-0088
22K OHM 1/4W 5%	3	R6,R9,R13	100E-00005-0096
47K OHM 1/4W 5%	2	R10,R14	100E-00005-0104
150K OHM 1/4W 5%	2	R6,R15	100E-00005-0120
470K OHM 1/4W 5%	2	R16,R19	100E-00005-0132
1K OHM 5 PIN SIP	1	RM8	102E-00004-0010
1K OHM 9 PIN SIP	4	RM1,4,11,13	102E-00004-0011
2.2K OHM 8 PIN SIP	5	RM2,3,5,6,7	102E-00004-0042
4.7K OHM 6 PIN SIP	2	RM9,RM10	102E-00004-0027
4.7K OHM 9 PIN SIP	1	RM12	102E-00004-0024
2K OHM POT	1	VR1	105E-00001-0038
ZENER DIODE 6.2V	1	D1	103E-00001-0011
74LS00	2	4K,8D	0300-00803-0027
74LS04	3	5C,6D,7G	0300-00803-0029
74S04	1	4A	0304-00803-0011
74LS08	2	5D,6C	0300-00803-0030
74S10	1	5E	0A87-00803-0001
74LS20	2	4E,6B	0300-00803-0052
74LS30	1	2C	0304-00803-0016
74LS32	1	6M	0300-00803-0031
74LS74	2	4H,7N	0300-00803-0032
74S74	1	8C	0986-00803-1500
74LS86	2	5BB,8L	0300-00803-0054
74LS139	1	8M	0508-00803-0034
74S139	1	5BA	0300-00803-5100
74LS153	1	9P	0986-00803-1000
74LS157	6	4G,4J,6K,7K, 7L,7M	0300-00803-0050
74LS158	1	7F	0300-00803-0049
74S163	1	5AB	0A87-00803-0002
74LS174	1	4L	0300-00803-0047
74LS175	1	4M	0304-00803-0025
74LS245	7	3H,3N,7C,8E,8F, 8P,9H	0300-00803-0046
74LS257	2	7D,7E	0316-00803-0002
74LS273	3	9G,9K,9M	0935-00804-1500
74LS298	1	9N	0316-00803-0019
74LS365	2	6E,6G	0316-00803-0020
74LS368	1	7H	0316-00803-0004
74LS375	1	8H	0A29-00803-0007
74LS378	1	4N	0316-00803-0018
4460 AUDIO AMP	1	1N	0066-3738X-YBAX

DESCRIPTION	QTY	DESIGNATION NO.	PART NUMBER
11XX CUSTOM IC	1	5J	0066-018CX-XAPX
15XX CUSTOM IC	1	5F	0066-020CX-XAPX
16XX CUSTOM IC	1	3J	0066-021CX-XAPX
20XX CUSTOM IC	1	6J	0066-035CX-XAPX
21XX CUSTOM IC	1	3P	0066-036CX-XAPX
26XX CUSTOM IC	1	1B	0066-037CX-XAPX
29XX CUSTOM IC	1	3C	0066-038CX-XAPX
33XX CUSTOM IC	1	6F	0066-039CX-XAPX
34XX CUSTOM IC	1	8A	0066-040CX-XAPX
56XX CUSTOM IC	1	1H	0066-022CX-XAPX
58XX CUSTOM IC	1	1F	0066-028CX-XAPX
62XX CUSTOM IC	1	2J	0066-041CX-XAPX
98XX CUSTOM IC	1	1L	0066-042CX-XAPX
99XX CUSTOM IC	1	1M	0066-029CX-XAPX
OP AMP TL 082	1	1J	0333-00803-0029
M88148L-55 RAM	4	3A,3B,5G,5H	
M58725 RAM	3	3K,3L,3M	
M58725P RAM	1	9J	
2114 RAM	1	3G	0508-00803-0300
ROM	15	1C,1D,2D,3E,3F, 4F,5K,5L,5M,5N, 6L,6M,6N,7B,8G, 8N,9C,9D,9E,9I	SEE NOTE
68A09E CPU	3	6A,6P,8B	
24.576 MHZ XTAL	1	X1	109E-00001-0020
8 POS DIP SW	2	1E,2E	0300-00804-0700
3 PIN AMP CONN	1	J1	0017-00021-0443
6 PIN AMP CONN	1	J2	0017-00021-0424
JUMPER WIRE	7	JW1,JW2,R43-R46,FB1	0151-00087-0000
HEATSINK AUD AMP	1	HEATSINK	0353-00900-0000
MNTG SCRW 4-40X7 PAN HD	2		0017-00101-0511
#4 FLT WASHER	4		0017-00104-0092
4-40 HEX NUTS	2		0017-00103-0093
THERMAL CMPD	.001		0017-00009-0204
BLANK PCB	1		A080-91741-CA87

NOTE: 1FS,1HS 100E-00001-0013; 1BS,6AS,6PS,8BS 100E-00001-0011; 2CS,6JS 100E-00001-0019; 1CS,1DS,2DS,3ES, 3FS,4FS,8GS 100E-00001-0003; 3AS,3BS,5GS,5HS 100E-00001-0004; 8NS 100E-00001-0005; 2AS,3LS,3MS,9JS, 1PS, 2JS,3JS,5FS,5JS, 5KS,5LS,5MS,5NS, 6FS,6LS,6MS,6NS, 7BS,8AS,9CS,9DS, 9ES,9LS 100E-00001-0007; 28 PIN IC SOCKET 18 100E-00001-0010

DIM TOLERANCES UNLESS OTHERWISE SPEC: CONCENTRICITY ± .002 FRACTIONAL ± 1/64 DECIMAL ± .005 HOLE DIA + .002 .000 ANGLE ± 1/2° DO NOT SCALE DWG

GAPLUS — DRAWN 7/10/84

Bally/MIDWAY MFG. CO. FRANKLIN PARK, IL 60131

ASS'Y DRAWING GAPLUS LOGIC P.C. A084-91741-CA87

REVISIONS

PART NO. M051-00A87-C009

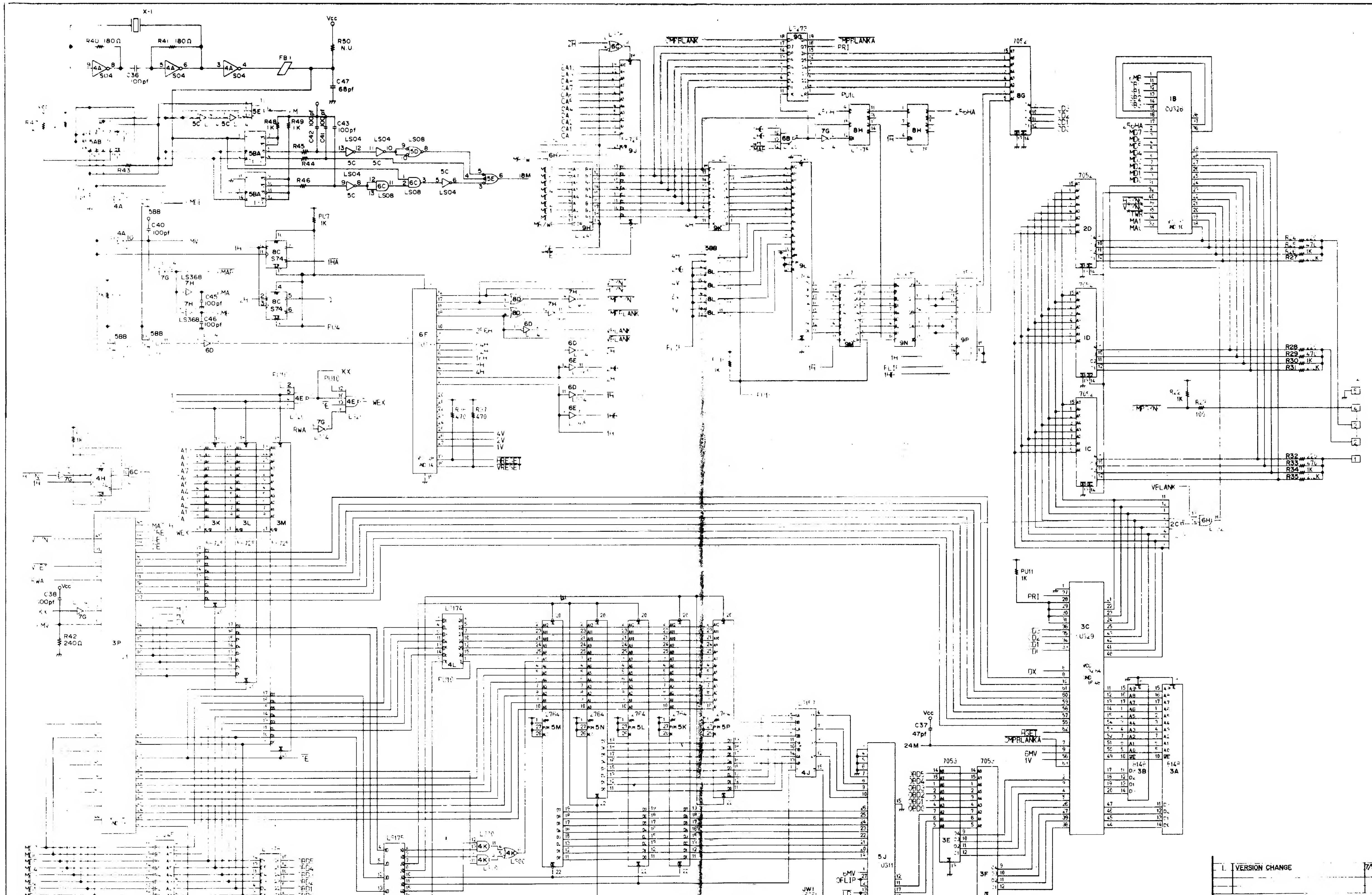
	VERSION CHANGE	7/9/84
	REVISIONS	

PROJECT ENG. JERRY SZERSZEN		USED ON GAPLUS	Bally / MIDWAY MFG. CO. FRANKLIN PK ILL
DO NOT SCALE DWG	HEAT TREAT	SCALE	NO. REQ'D 1 OF 3
DIM. TOLERANCES UNLESS SPECIFIED	MAT'L	SCHEMATIC DRAWING GAPLUS LOGIC P.C. A080-91741-CA87	PART NO M051-00A87-C010
DRN	FINISH		
DATE 7/09/84			

NOTE

1). ALL TTL IC'S ARE 74XX TYPE

2). UNLESS NOTED OTHERWISE, ALL RESISTOR VALUES ARE IN OHMS AND ALL CAPATORS ARE IN μF.



NOTE

1) WHEN ROM LOCATION 5P IS USED, JW1 IS OMITTED JW2 MUST BE JUMPERED.
2) ALL TTL IC'S ARE 74XX TYPE.
3) UNLESS NOTED OTHERWISE, ALL RESISTOR VALUES ARE IN OHMS AND ALL CAPATORS ARE IN μF.

1	VERSION CHANGE	7/9/84

REVISIONS

PROJECT ENG JERRY SZERSZEN

USED ON GAPLUS

NO REQ'D 2 OF 3

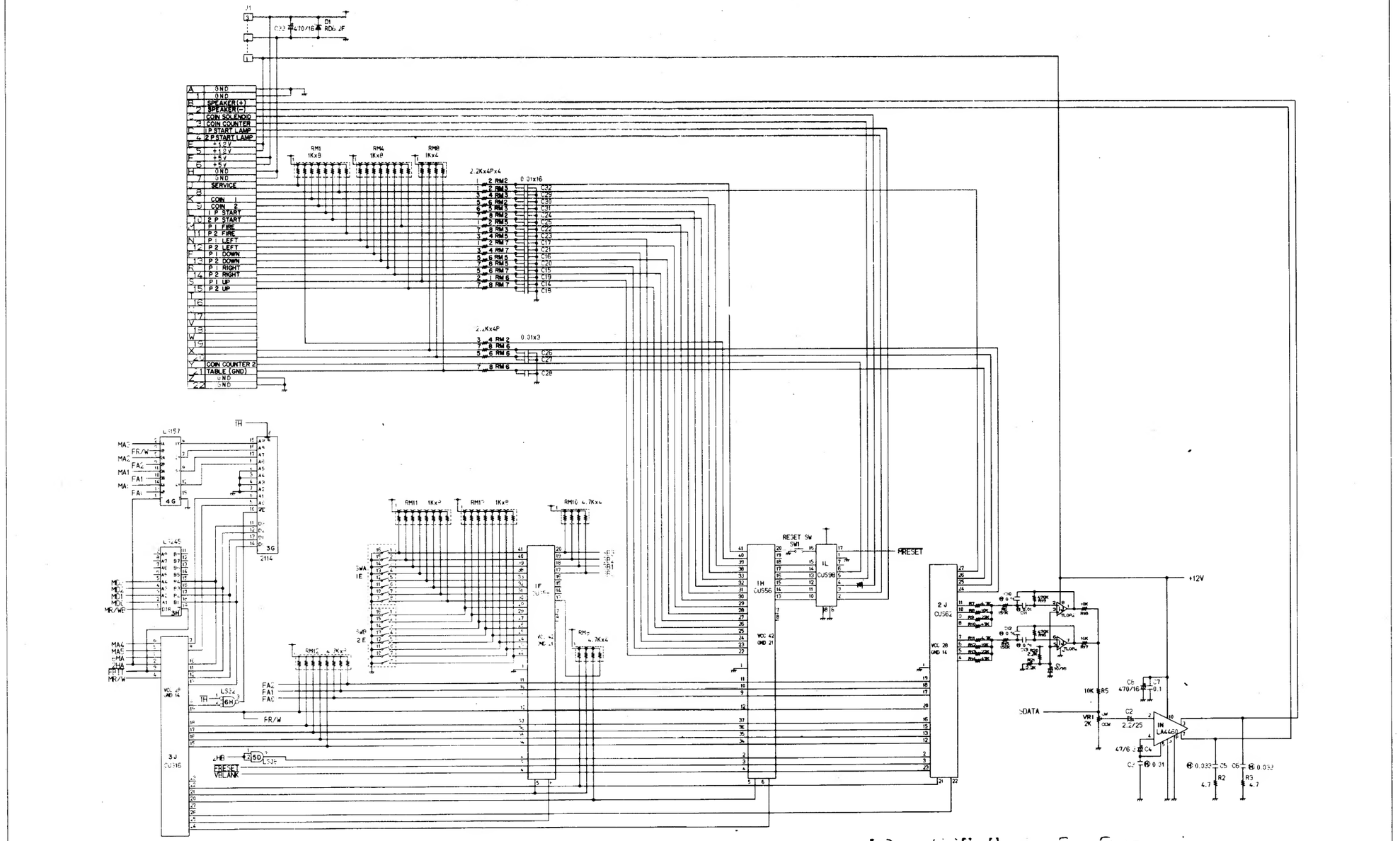
Bally / MIDWAY MFG. CO.

DO NOT SCALE DWG

DATE 7/09/84

SCHEMATIC DRAWING
GAPLUS LOGIC P.C.
A080-91741-CA87

PART NO
M051 - 00A87 - C010



NOTE

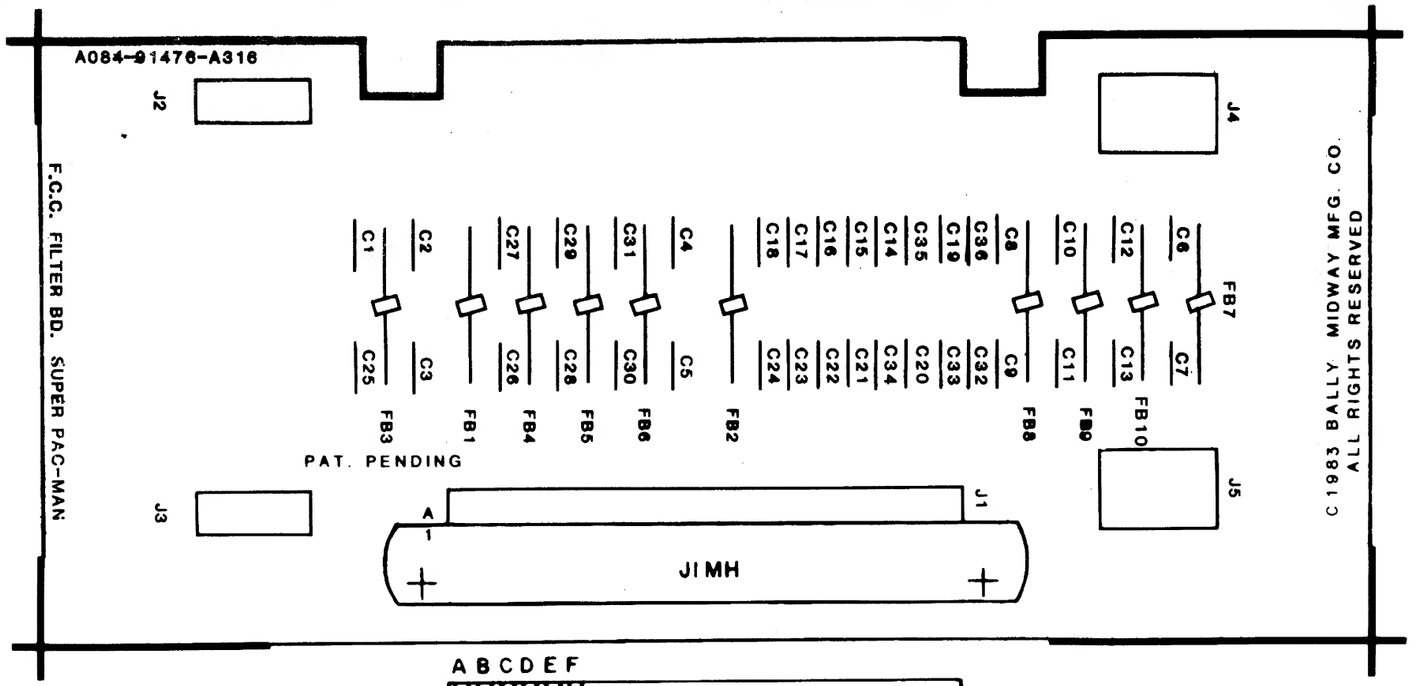
1) ALL TTL IC'S ARE 74XX TYPE.
2) UNLESS NOTED OTHERWISE, ALL RESISTOR VALUES ARE IN OHMS AND ALL CAPATORS ARE IN μF.
3) Ⓜ DENOTES POLYESTER FILM CAP.

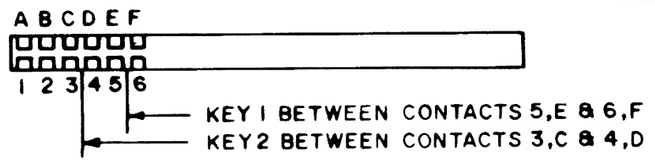
PRELIMINARY

1	VERSION CHANE	7/9/84
	REVISIONS	

PROJECT ENG: JERRY SZERSZEN		USED ON GAPLUS	Bally / MIDWAY MFG.CO. FRANKLIN PK ILL
DO NOT SCALE DWG	WEAR FINISH	SCALE	NO REQ'D 3 OF 3
DIM TOLERANCES UNLESS SPECIFIED	DRN. CC	MAT'L	SCHEMATIC DRAWING GAPLUS LOGIC P.C. A080-91741-CA87
	CHD.	FINISH	PART NO M051 - 00A87 -C010
	DATE 7/09/84		

DESIGNATION NO.	DESCRIPTION
C1 – C5	390pf 50V. AX. CER.
C6, C7	470pf " " "
C8 – C13	100pf " " "
C14 – C24	.01 µf " " "
C25	390pf " " "
C26 – C29	.01 µf " " "
C30, C31	390pf " " "
C32 – C36	.01 µf " " "
FB1 – FB10	FERRITE BEAD
J1	P.C. EDGE CONN.
J2, J3	3 PIN HEADER
J4, J5	6 PIN HEADER
J1MH	(2) P.C. EDGE CONN. KEY
"	(2) 6-32 X 10 SLOT PAN SCREW
"	(2) WSH. 6 145-.250-.032
"	(1) BRKT. - CONN. FIN.
–	(1) INSULATED GND. STRAP
–	(1) 8-32 X 5 SLOT PAN SCREW
–	(1) 8-32 NUT HEX
A080-91476-A316	F.C.C. FILTER BD. SUPER PAC-MAN





DESCRIPTION	Q'TY	DESIGNATION NO.	PART NO.
100pf 50V. AX. CER.	6	C8 – C13	0789-00800-1800
390pf " " "	8	C1 – C5, C25, C30, C31	0316-00800-0002
470pf " " "	2	C6, C7	0550-00800-0200
.01 µf " " "	20	C14-C24, C26-C29, C32-C36	0550-00800-0300
FERRITE BEAD	10	FB1-FB10	0316-00804-0002
P.C. EDGE CONN	1	J1	0017-00021-0418
3 PIN HEADER	2	J2, J3	0017-00021-0445
6 PIN HEADER	2	J4, J5	0017-00021-0424
P.C. EDGE CONN. KEY	2	J1MH	0017-00021-0396
6-32 X 10 SLOT PAN SCREW	2	"	0017-00101-0574

DESCRIPTION	Q'TY	DESIGNATION NO.	PART NO.
WSH. 6 145-.250-.032	2	J1MH	0017-00104-0002
BRKT. - CONN. FIN.	1	"	0866 00118-00XF
INSULATED GND. STRAP	1	–	3000-17143-0700
8-32 X 5 SLOT PAN SCREW	1	–	0017-00101-0595
8-32 NUT HEX	1	–	0017-00103-0008
F.C.C. FILTER BD. SUPER PAC-MAN	1	A080-91476-A316	A080-91476-A316

REVISIONS

PROJECT ENG: L. DEKKER		SUPER PAC-MAN	Bally / MIDWAY MFG. CO. FRANKLIN PK
DO NOT SCALE DWG.	HEAT TREAT	SCALE FULL	PAPER
DIM. TOLERANCE UNLESS SPECIFIED DRN. R4W CKD. DATE 02/08/83	MAT'L	ASSEMBLY DRAWING F.C.C. FILTER BD SUPER PAC-MAN A084-91476-A316	PART NO M051-00316-A026
	FINISH		

DESIGNATION #	DESCRIPTION
C101	4700uf AX. ELECT
C102	470uf AX. ELECT
C103	.1uf AX. CER.
C104	.1uf AX. CER
C105	47pf AX. CER
C106	470uf AX. ELECT.
C107	100uf RD. TANT.
C108	1uf RD. TANT.
C109	4.7uf RD. TANT
C110	.1uf AX. CER.
C111	.1uf AX. CER.
C201	.01uf MYLAR
C202	.033uf MYLAR
C203	.01uf MYLAR
C204	.047uf MYLAR
C205	820pf AX. CER.
C206 - C208	.01uf AX. CER.
C207	0.082uf MYLAR
CP1	1uf AX. CER
R101	18 ohm 5W W/RES. SPACER
R102	68ohm 1/2W 5%
R104	10ohm 5W W/RES. SPACER
R105	27ohm 1/4W 5%
R106	270ohm 1/4W 5%
R107	6.2K 1/4W 5%
R109	1K 1/4W 5%
R110	16ohm 15W W/RES. SPACER
R111	6.8ohm 1/2W5%
R112	68ohm 1/2W 5%
R113	1.2K 1/4W 5%
R114	47ohm 1/4W 5%
R115	160ohm 1/4W 5%

DESIGNATION #	DESCRIPTION
R117	560ohm 1/4W 5%
R118	150ohm 2W
R201	270ohm 1/4W 5%
R202	1.2K 1/4W 5%
R203	1.1M 1/4W 5%
R204	3.3M 1/4W 5%
R205	10M 1/4W 5%
R206	100K 1/4W 5%
R207	33K 1/4W 5%
R208	2M 1/4W 5%
R209	1M 1/4W 5%
R210	1.2M 1/4W 5%
R211	75K 1/4W 5%
R212	75K 1/4W 5%
R213	220K 1/4W 5%
R214	3.9K 1/4W 5%
R215	1.2K 1/4W 5%
R216	82ohm 1W 10%
R217	270ohm 1/4W 5%
R218	110K 1/4W 5%
R219	68ohm1/2W5%
VR101,102	100ohm POT
D101	A15F
D102	A15F
D103	A15F
D104	A15F
D105	A15F
D106	1N4001
D201	1N4148
D202	1N4148
D203	1N4148
D204	1N4001
D205	1N4001
Q102	2N2905
Q105	2N2905
Q201	2N4401

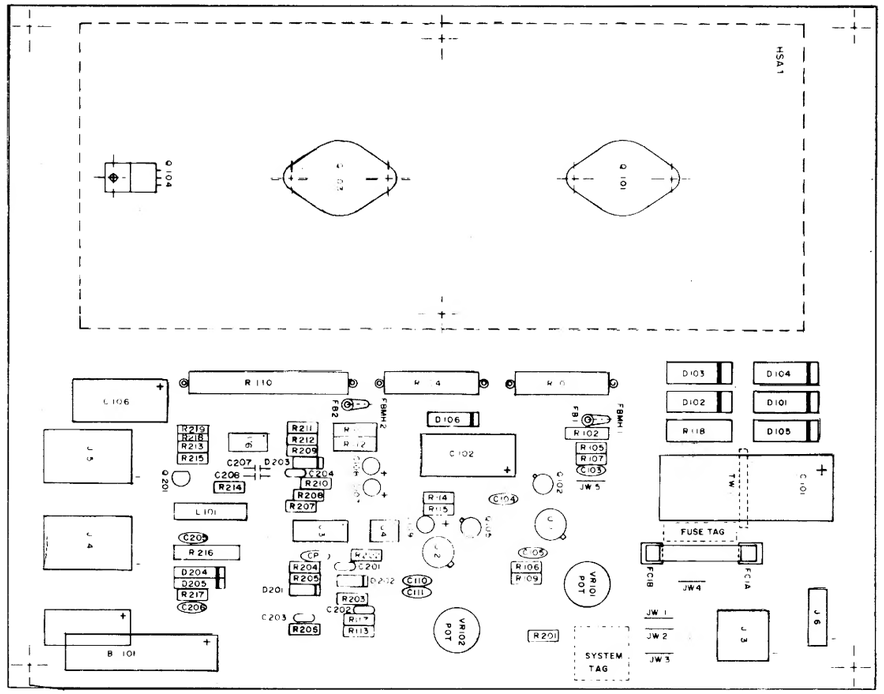
DESIGNATION #	DESCRIPTION
U1	LM305 REG.
U2	LM305 REG
U3	LM3900
U4	4N28
U6	555
L101	.22uH INDUCTOR
B101	BATTERY 3.6VDC 60DEG C
F1	3.8A S BLO FUSE
FC1A,1B	FUSE CLIP
FB1,2	FERRITE BEAD
TW1	TIE WRAP
J3	9PIN P.C. MOUNT CONN.(MALE)
J4	15PIN P.C. MOUNT CONN.(FEMALE)
J5	15PIN P.C. MOUNT CONN.(MALE)
J6	3PIN P.C. MOUNT CONN.(MALE)
LB1	FUSE TAG
LB2	SYSTEM TAG
HSA1	HEAT SINK ASS'Y 1
MHHSA1	MOUNTING HARD WARE(HEAT SINK) 2 SCREW 4 WASHER 2 HEXNUT
JW1-5	JUMPER WIRE
FBMH1,2	FERRITE BEAD MOUNTING HARDWARE

DESCRIPTION	Q'ty
47pf AX. CER.	1
820pf AX. CER.	1
.01uf AX. CER	2
.01uf MYLAR	2
.033uf MYLAR	1
.047uf MYLAR	1
0.082uf AX.CER	1
.1uf AX. CER.	5
1uf RAD. TANT	1
4.7uf RAD. TANT	1
100uf RAD. TANT	1
470uf AX. ELECT.	2
470Cuf AX. ELECT.	1
.16ohm 15W 5%	1
.18ohm 5W 5%	1
6.8ohm 1/2W 5%	1
10ohm 5W 5%	1
27ohm 1/4W 5%	1
47ohm 1/4W 5%	1
68ohm 1/2W 5%	3
82ohm 1W 10%	1
150ohm 2W 5%	1
160ohm 1/4W 5%	1
270ohm 1/4W 5%	3
560ohm 1/4W 5%	1
1K 1/4W 5%	1
1.2K 1/4W 5%	3
3.9K 1/4W 5%	1
6.2K 1/4W 5%	1
33K 1/4W 5%	1
75K 1/4W 5%	2
100K 1/4W 5%	1
110K 1/4W 5%	1
220K 1/4W 5%	1
1M 1/4W 5%	1
1.1M 1/4W 5%	1
1.2M 1/4W 5%	1
2M 1/4W 5%	1
3.3M 1/4W 5%	1
10M 1/4W 5%	1
100ohm POT	2

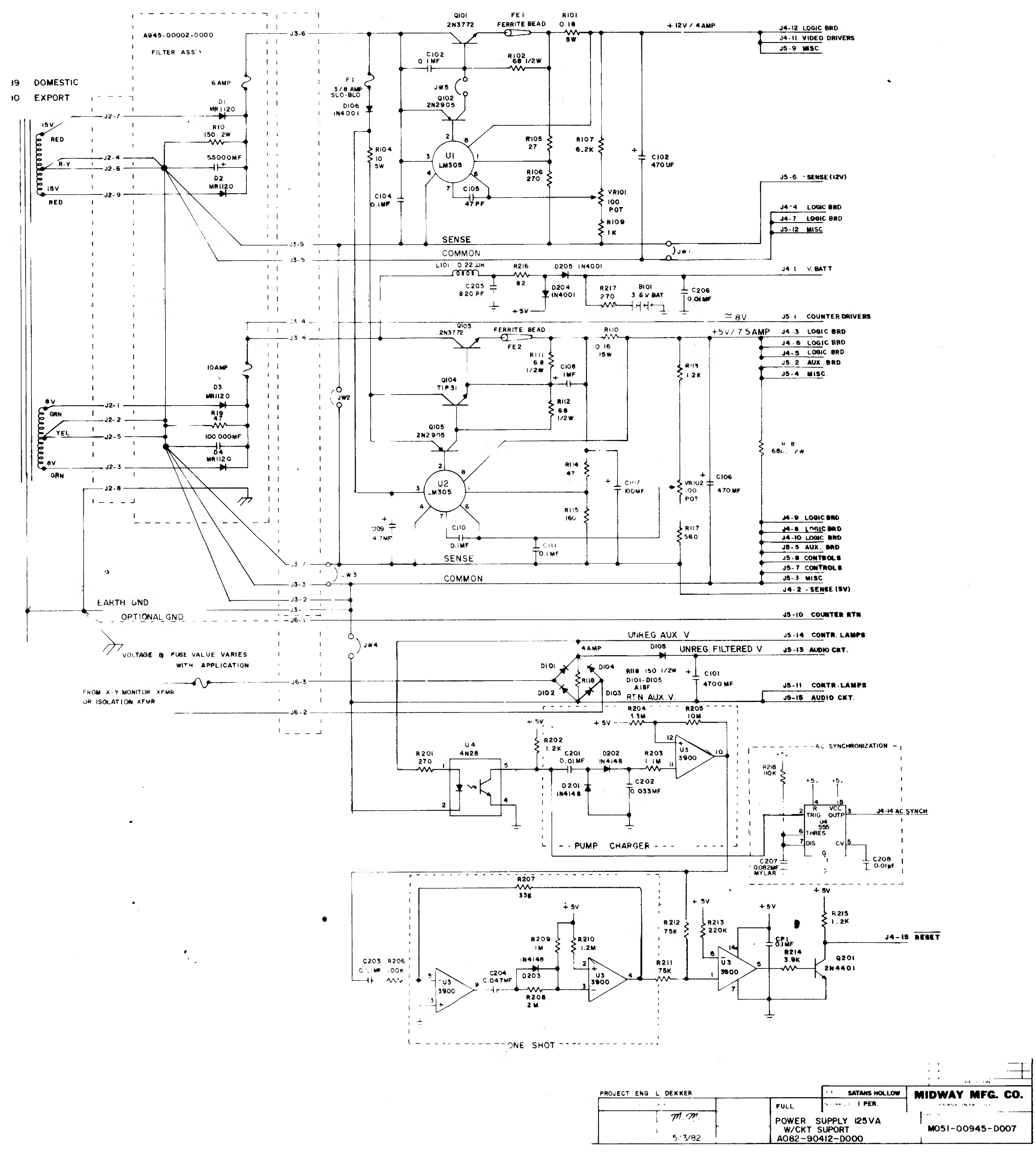
DESIGNATION #	PART #
C105	0945-00811-0100
C205	0945-00816-0400
C206,208	0945-00616-0100
C201,203	0945-00516-0200
C202	0945-00816-0500
C204	0945-00816-0300
C207	0945-00816-1900
C103,104,110,111, CP1	0945-00811-0200
C108	0945-00811-0300
C109	0945-00811-0400
C107	0945-00811-0500
C102,106	0945-00816-0600
C101	0945-00811-0700
R110	0945-00815-0100
R101	0945-00815-0200
R111	0062-0473D3 1XXX
R104	0945-00812-0100
R105	0062-0683B3-1XXX
R114	0062-0686B3-1XXX
R102,112,219	0062-0983D3 1XXX
R216	0062-1045F5 1XXX
R118	0945-00812-0200
R115	0062-1243B3 1XXX
R106,201,217	0062-1383B3 1XXX
R117	0062-1623B3-1XXX
R109	0062-1793B3-1XXX
R113,202,215	0062-1833B3-1XXX
R214	0062-2073B3-1XXX
R107	0062-2173B3-1XXX
R207	0062-2513B3-1XXX
R211,212	0062 2693B3 1XXX
R206	0062-2753B3 1XXX
R218	0062-2773B3-1XXX
R213	0062-2913B3 1XXX
R209	0062-3233B3 1XXX
R203	0062-3253B3 1XXX
R210	0062-3273B3-1XXX
R208	0062-3373B3 1XXX
R204	0062-3473B3 1XXX
R205	0062-3713B3-1XXX
VR101,102	0945-00814-0000

DESCRIPTION	Q'ty
LM305 REG	2
555	1
LM3900	1
4N28	1
A15F RECTIFIER	5
1N4001	3
1N4148	3
2N2905	2
2N4401	1
BATTERY 3.6VDC 60DEG C	1
FUSE 3/8A S BLO	1
FUSE CLIP	2
TIE WRAP	1
FERRITE BEAD	2
FERRITE MOUNTING HDW	2
.22uH INDUCTOR	1
FUSE TAG	1
SYSTEM TAG	1
P.C.B.	1
HEAT SINK ASS'Y (SEE HS ASS'Y DRAWING "NOTE")	1
4-40 X 10 SLT RND	2
4-40 HEX NUT	2
WSH 4-120-.250-018	4
3PIN P.C. MOUNT CONN. (MALE)	1
9PIN P.C. MOUNT CONN.(MALE)	1
15PIN P.C. MOUNT CONN.(FEMALE)	1
15PIN P.C. MOUNT CONN.(MALE)	1
22 AWG T&R BARE 2.5"	5

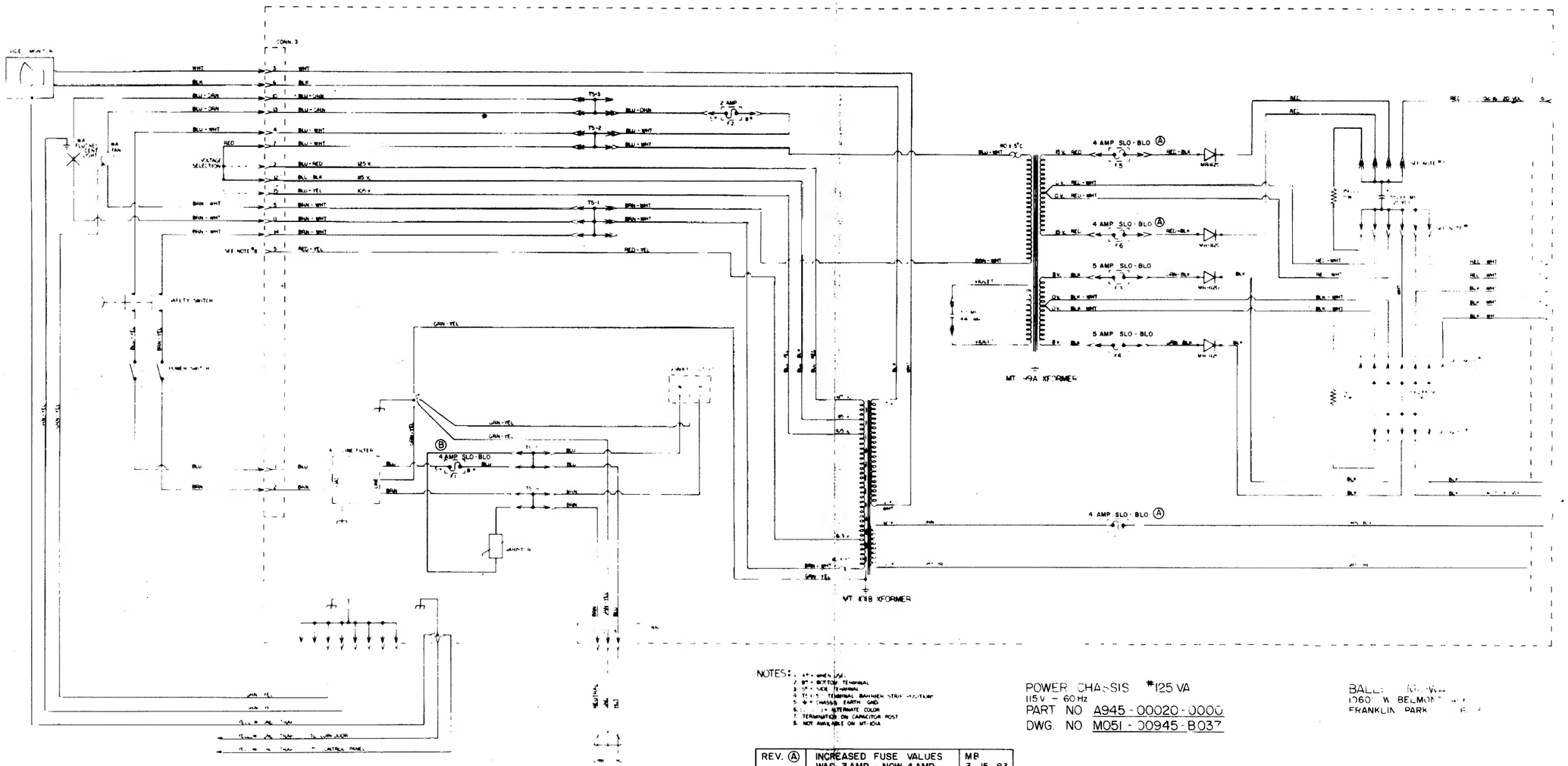
DESIGNATION #	PART #
U1,2	0945-00813-0100
U6	0929-00810-4500
U3	0945-00813-0200
U4	0945-00813-0300
D101-105	0945-00804-0200
D106,204,205	0945-00804-0300
D201-203	0945-00804-0500
Q102,105	0945-00808-0300
Q201	0945-00804-0400
B101	0017-00003-0377
F1	0945-00808-0400
FC1A,1B	0017-00003-0214
TW1	0945-00814-0300
FB1,2	0017-00009-0225
FBMH1,2	0017-00033-0135
L101	0945-00814-0200
MO51-00945-A004	
MO51-00945-A009	
A080-90412-D000	
HSA1	A945-00008-0000
MH HSA 1A,2A.	0017-00101-00727
MH HSA1E,2E.	0017-00103-0002
MH HSA 1B,1D MH HSA 2B,2D	0017-00104-0071
J6	0017-00021-0443
J3	0017-00021-0425
J4	0017-00021-0444
J5	0017-00021-0440
JW1-5	0151-00087-0000



PROJ. ENG.: L. DEKKER			SATAN'S HOLLOW	MIDWAY MFG. CO. FRANKLIN PK. ILL.
DO NOT SCALE DWG			FULL	ASSEMBLY DRAWING 125VA PWRSPY
	DRAWN SBL			A082-90412-D000
	DATE 5/17/82			M051-00945-D006



19 DOMESTIC
10 EXPORT
A945-00002-0000
FILTER ASSY
6AMP
10AMP
EARTH GND
OPTIONAL GND
VOLTAGE & FUSE VALUE VARIES WITH APPLICATION
FROM X-Y MONITOR XFMR OR ISOLATION XFMR
SENSE
COMMON
+12V / 4AMP
J4-12 LOGIC BRD
J4-11 VIDEO DRIVERS
J5-9 MISC
J5-6 SENSE (12V)
J4-4 LOGIC BRD
J4-7 LOGIC BRD
J5-12 MISC
J4-1 V.BATT
≅8V
J5-1 COUNTER DRIVERS
+5V/7.5AMP
J4-3 LOGIC BRD
J4-6 LOGIC BRD
J4-5 LOGIC BRD
J5-2 AUX. BRD
J5-4 MISC.
J4-9 LOGIC BRD
J4-8 LOGIC BRD
J4-10 LOGIC BRD
J5-5 AUX. BRD
J5-8 CONTROLS
J5-7 CONTROLS
J5-3 MISC
J4-2 SENSE (5V)
J5-10 COUNTER RTN
UNREG AUX V
UNREG FILTERED V
J5-14 CONTR. LAMPS
J5-13 AUDIO CKT.
RTN AUX V
J5-11 CONTR. LAMPS
J5-15 AUDIO CKT.
PUMP CHARGER
AC SYNCHRONIZATION
J4-14 AC SYNCH
ONE SHOT
J4-15 RESET
PROJECT ENG L DEKKER
5/3/82
SATANS HOLLOW
FULL
POWER SUPPLY 125VA W/CKT SUPORT
A082-90412-D000
MIDWAY MFG. CO.
M051-00945-D007



NOTES:
1. A* = WHEN USED.
2. B* = BOTTOM TERMINAL
3. C* = NEXT TERMINAL
4. TS 1-3 = TERMINAL BARRIER STRIP ASSEMBLY
5. ⏚ = CHASSIS EARTH GND.
6. ( ) = ALTERNATE COLOR
7. TERMINATION ON CAPACITOR POST
8. NOT AVAILABLE ON MT-61A

REV. Ⓐ	INCREASED FUSE VALUES WAS 3 AMP - NOW 4 AMP ADDED PART NO. (UL)	MB 3-15-83
REV. Ⓑ	INCREASED FUSE VALUE WAS 3AMP - NOW 4 AMP	MB 3-24-83

POWER CHASSIS *125 VA
115 V - 60 Hz
PART NO A945-00020-0000
DWG. NO M051-00945-B037

BALL [illegible]
1060 W. BELMONT
FRANKLIN PARK